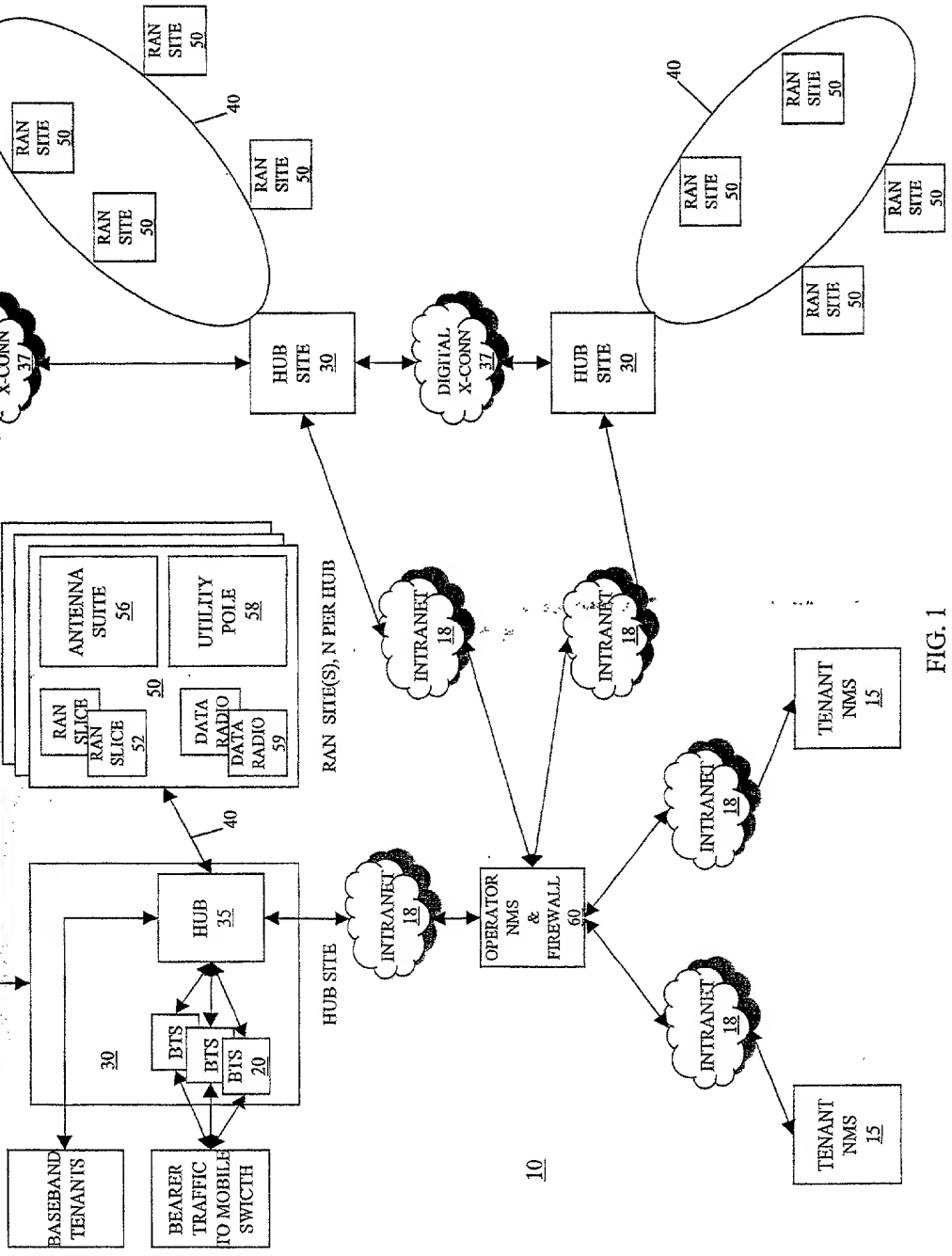
RAN SITE 50
40
DIGITAL X-CONN 37
HUB SITE 30
INTRANET 18
ANTENNA SUITE 56
UTILITY POLE 58
RAN SLICE 52
DATA RADIO 59
50
RAN SITE(S), N PER HUB
HUB 35
BTS 20
30
HUB SITE
OPERATOR NMS & FIREWALL 60
TENANT NMS 15
BASEBAND TENANTS
BEARER TRAFFIC TO MOBILE SWITCH
10

FIG. 1

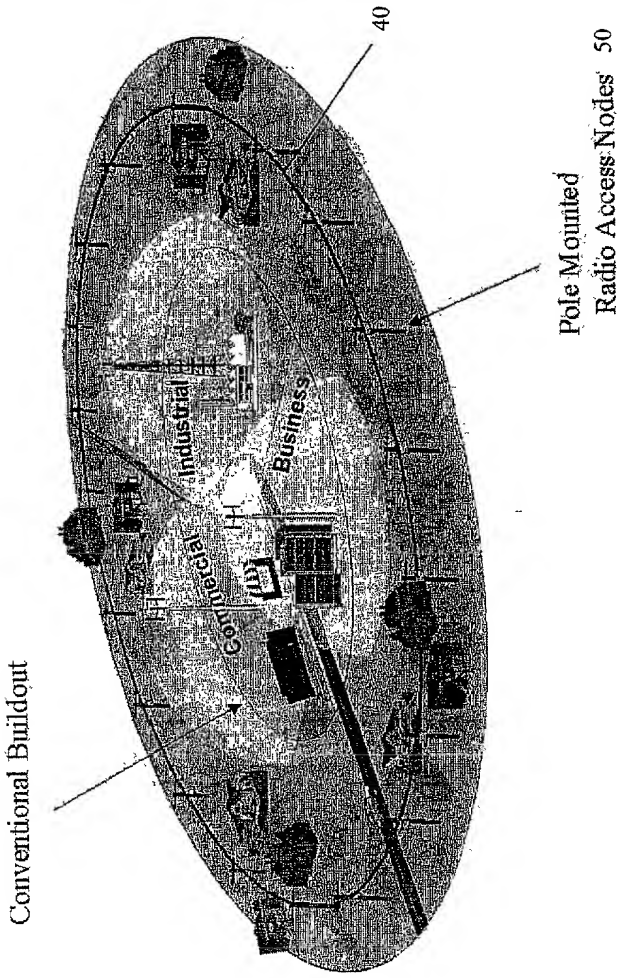
40
Pole Mounted
Radio Access Nodes 50
Conventional Buildout
Industrial
Commercial
Business
10

FIG. 2

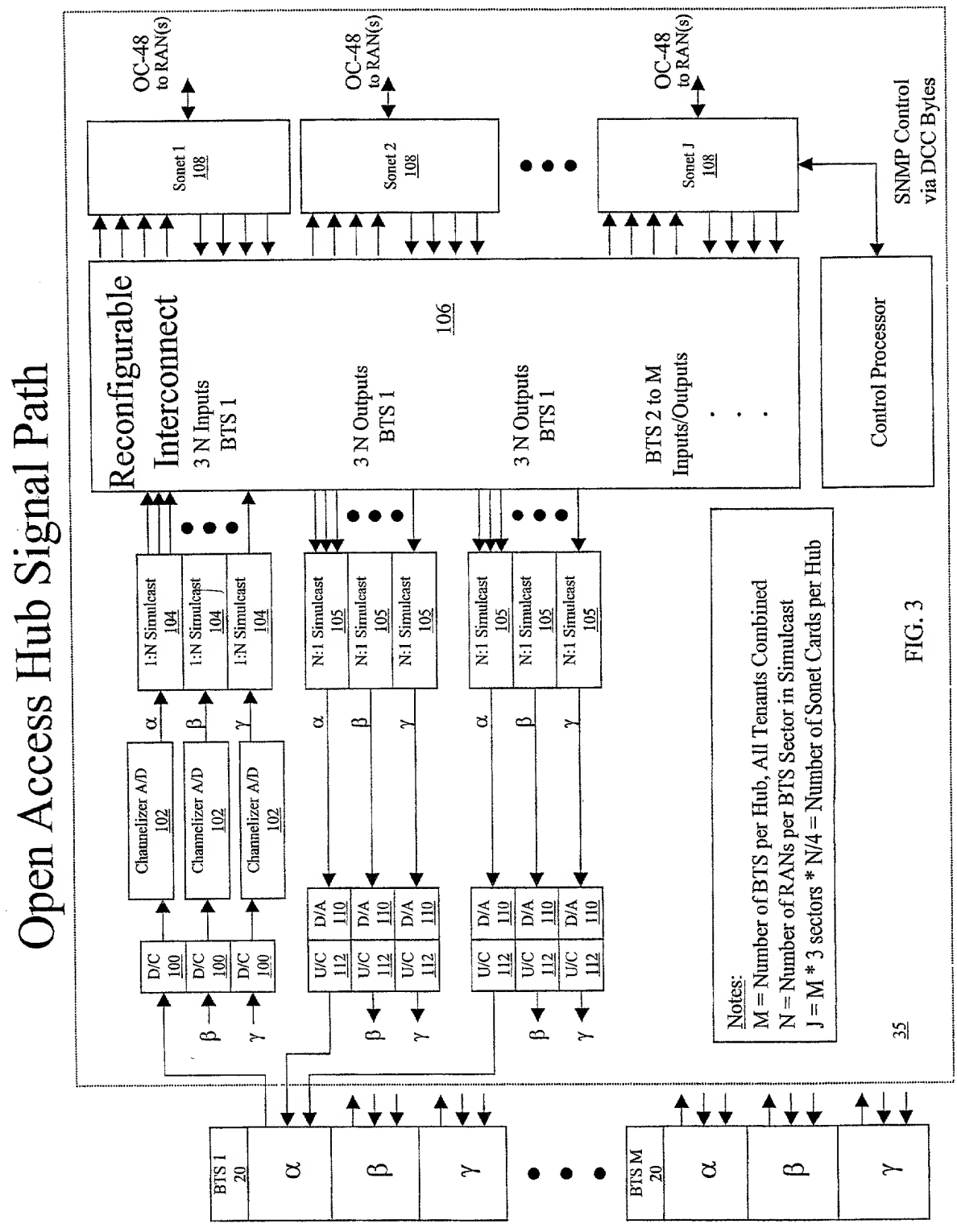
Open Access Hub Signal Path
OC-48 to RAN(s)
Sonet 1 108
Sonet 2 108
Sonet J 108
SNMP Control via DCC Bytes
Reconfigurable Interconnect
106
3 N Inputs BTS 1
3 N Outputs BTS 1
3 N Outputs BTS 1
BTS 2 to M Inputs/Outputs
Control Processor
Channelizer A/D 102
D/C 100
1:N Simulcast 104
N:1 Simulcast 105
U/C 112
D/A 110
α
β
γ
BTS 1 20
BTS M 20
Notes:
M = Number of BTS per Hub, All Tenants Combined
N = Number of RANs per BTS Sector in Simulcast
J = M * 3 sectors * N/4 = Number of Sonet Cards per Hub
35

FIG. 3

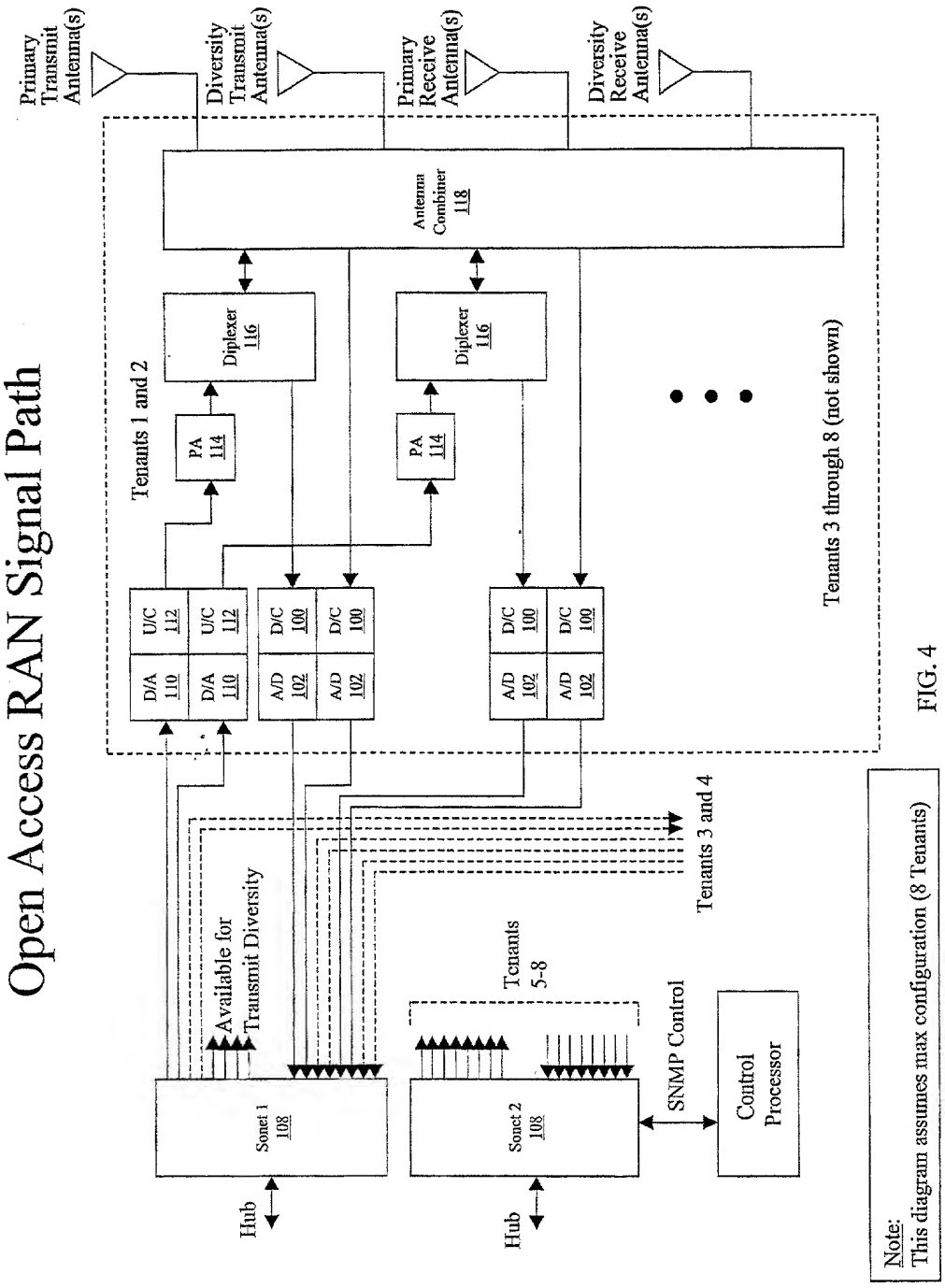
Open Access RAN Signal Path
Primary Transmit Antenna(s)
Diversity Transmit Antenna(s)
Primary Receive Antenna(s)
Diversity Receive Antenna(s)
Antenna Combiner 118
Diplexer 116
Diplexer 116
PA 114
PA 114
Tenants 1 and 2
Tenants 3 through 8 (not shown)
U/C 112
U/C 112
D/A 110
D/A 110
D/C 100
D/C 100
A/D 102
A/D 102
D/C 100
D/C 100
A/D 102
A/D 102
Available for Transmit Diversity
Tenants 3 and 4
Tenants 5-8
Sonet 1 108
Sonet 2 108
SNMP Control
Control Processor
Hub
Hub
Note:
This diagram assumes max configuration (8 Tenants)

FIG. 4

Simulcast Varied to Equalize Reverse Link Budgets
and to Balance With Forward Link Budget

	CDMA	TDMA	GSM1900
Reverse Link			
Mobile Transmit Power	23 dBm	28 dBm	30 dBm
RAN Sensitivity	-120 dBm	-111 dBm	-110 dBm
Allowable Reverse Path Loss without Simulcast	143 dB	139 dB	140 dB
Number in Simulcast	8	3	4
Allowable Reverse Path Loss with Simulcast	134 dB	134 dB	134 dB
Forward Link			
RAN Transmit Power per Traffic Channel	20 dBm	32 dBm	32 dBm
Mobile Sensitivity less Interference Margin	-114 dBm	-102 dBm	-102 dBm
Allowable Forward Path Loss	134 dB	134 dB	134 dB

FIG. 5

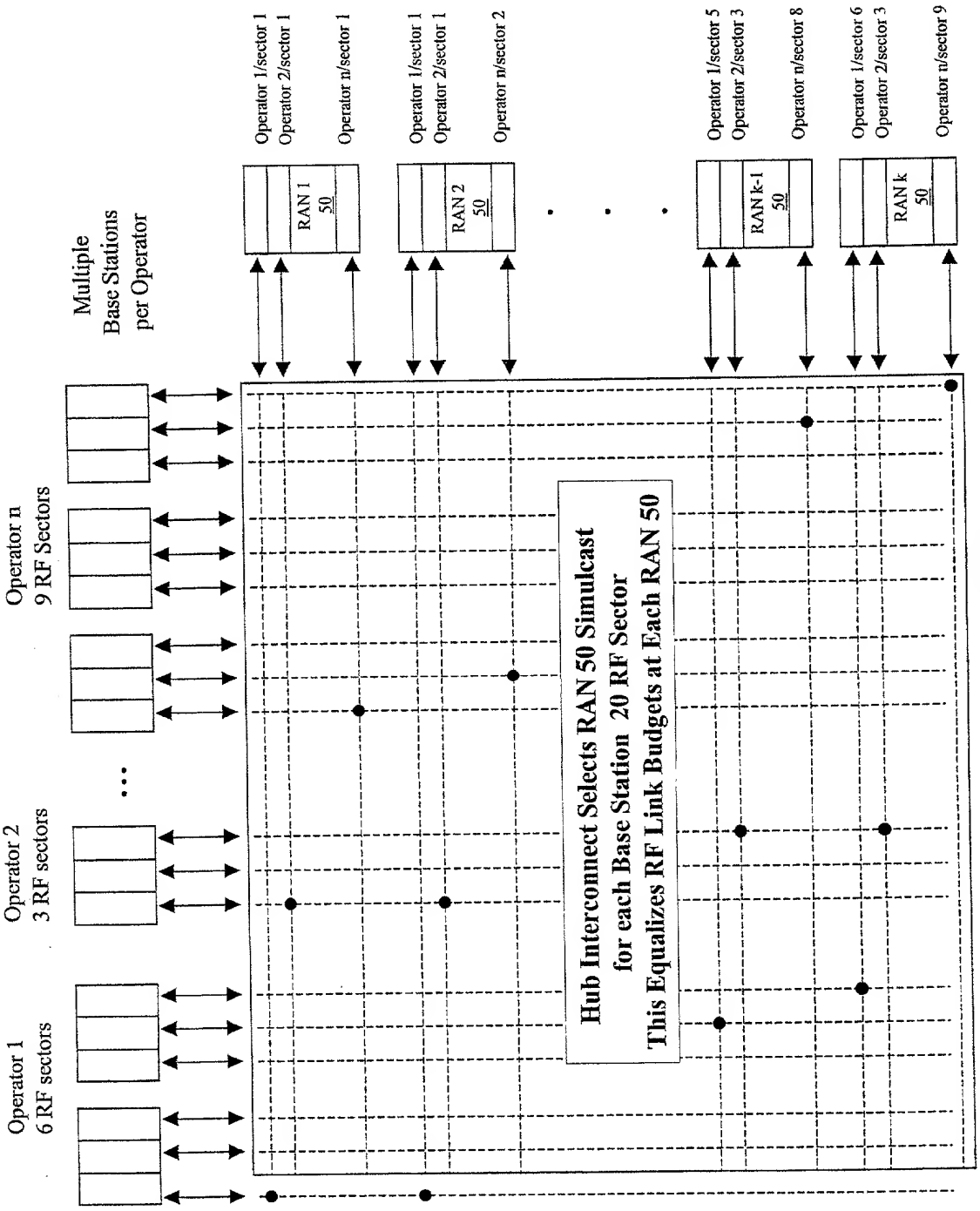
Operator 1
6 RF sectors
Operator 2
3 RF sectors
Operator n
9 RF Sectors
Multiple
Base Stations
per Operator
Operator 1/sector 1
Operator 2/sector 1
Operator n/sector 1
RAN 1
50
Operator 1/sector 1
Operator 2/sector 1
Operator n/sector 2
RAN 2
50
Operator 1/sector 5
Operator 2/sector 3
Operator n/sector 8
RAN k-1
50
Operator 1/sector 6
Operator 2/sector 3
Operator n/sector 9
RAN k
50
Hub Interconnect Selects RAN 50 Simulcast
for each Base Station 20 RF Sector
This Equalizes RF Link Budgets at Each RAN 50

FIG. 6

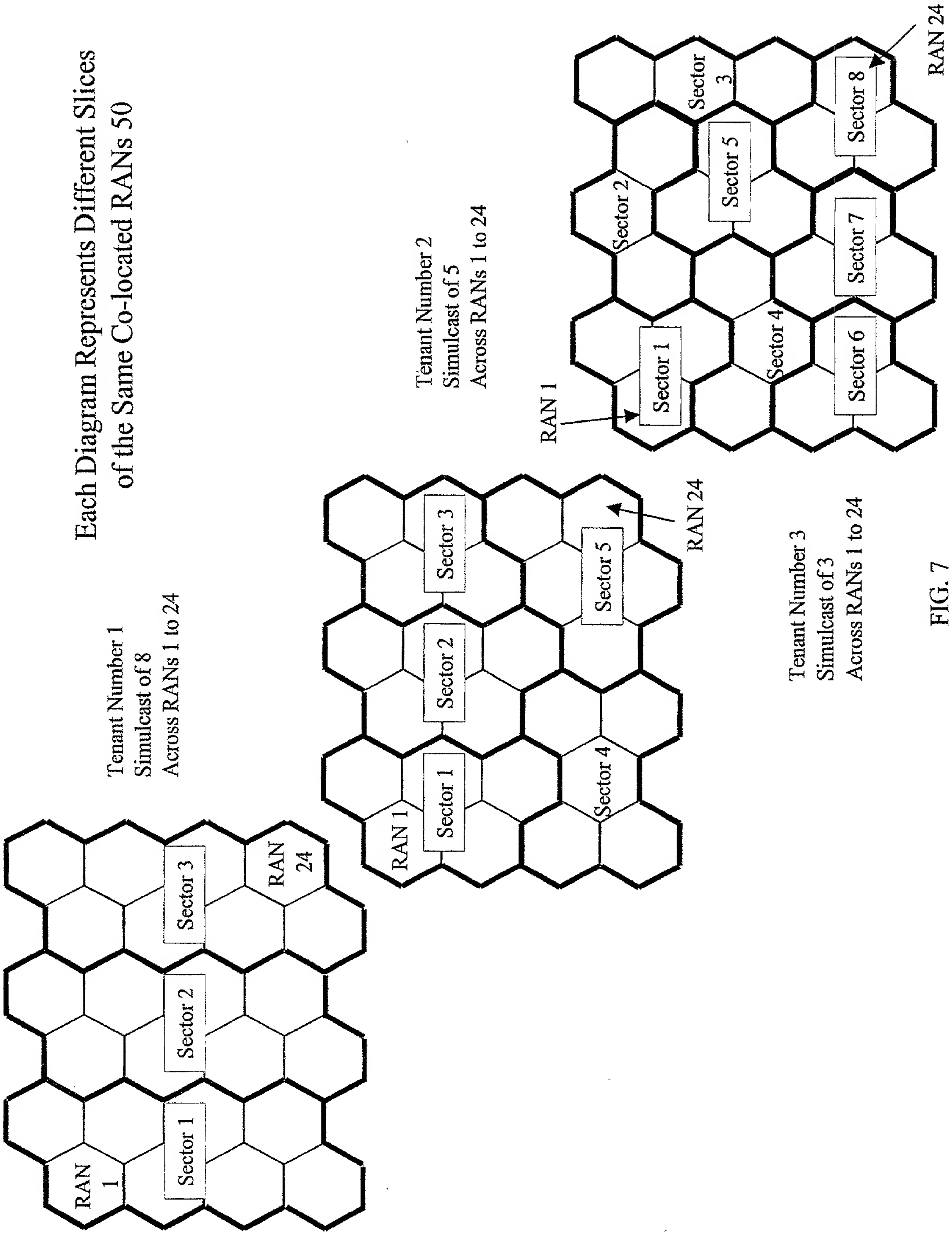
Each Diagram Represents Different Slices
of the Same Co-located RANs 50
Tenant Number 1
Simulcast of 8
Across RANs 1 to 24
RAN 1
RAN 24
Sector 1
Sector 2
Sector 3
Tenant Number 2
Simulcast of 5
Across RANs 1 to 24
RAN 1
RAN 24
Sector 1
Sector 2
Sector 3
Sector 4
Sector 5
Tenant Number 3
Simulcast of 3
Across RANs 1 to 24
RAN 1
RAN 24
Sector 1
Sector 2
Sector 3
Sector 4
Sector 5
Sector 6
Sector 7
Sector 8

FIG. 7

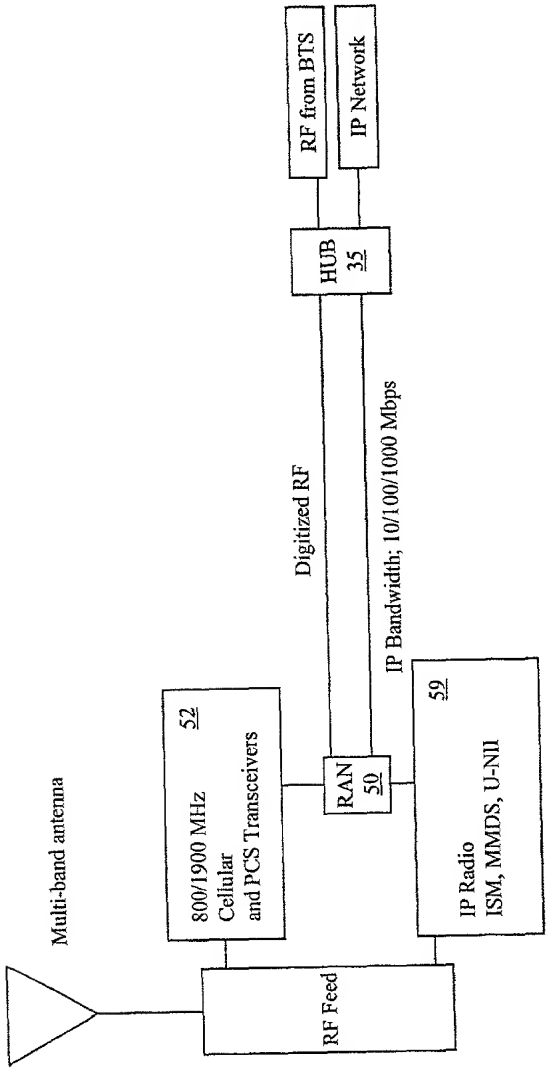
RF from BTS
IP Network
HUB 35
Digitized RF
IP Bandwidth; 10/100/1000 Mbps
RAN 50
800/1900 MHz Cellular and PCS Transceivers 52
IP Radio ISM, MMDS, U-NII 59
Multi-band antenna
RF Feed

FIG. 8

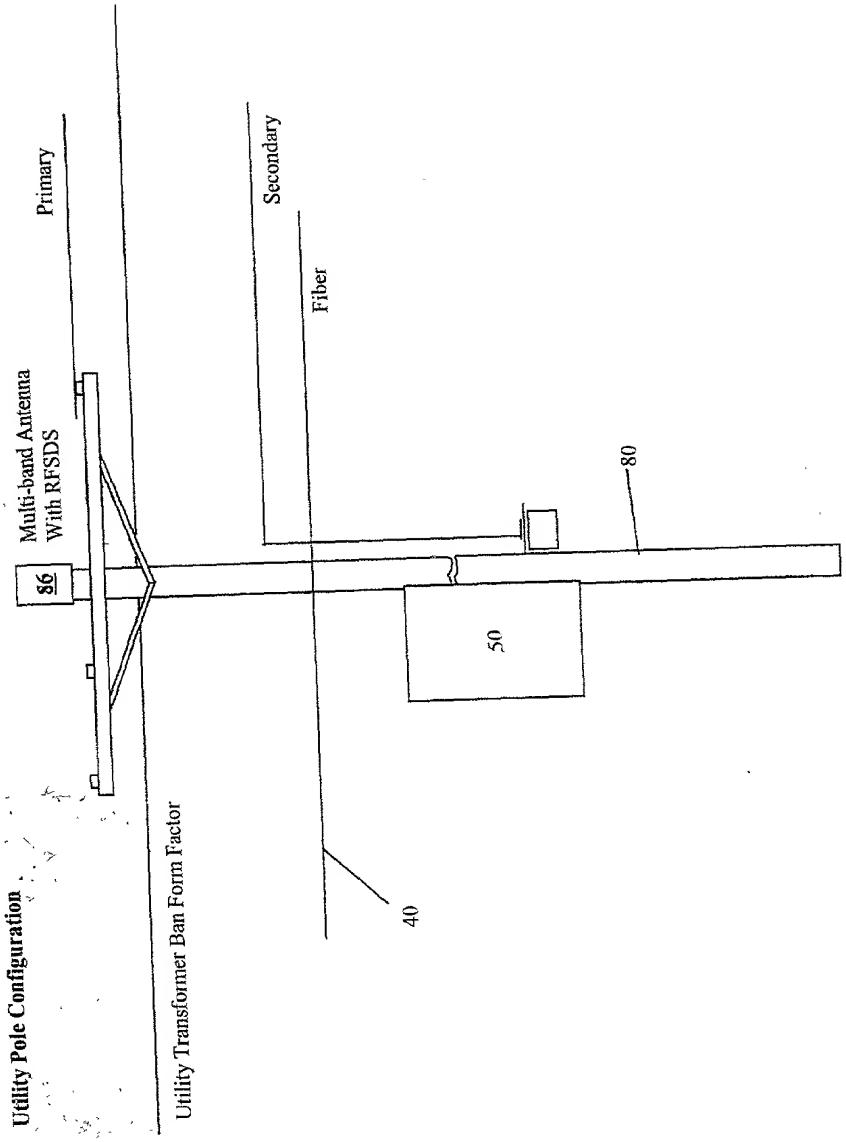
Utility Pole Configuration
Utility Transformer Ban Form Factor
Primary
Secondary
Fiber
Multi-band Antenna
With RFSDS
86
40
50
80

FIG. 9